Haier SERVICE MANUAL

Order No.Ref0905S003V0

Refrigerator

MODEL: AFL631*
CFE633*

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It dose not contain warnings and cautions to advice non-technical individuals of potential dangers in attempting to service a product. Product powered by electricity should by serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

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Chapter 1 General Information

1-1. General Guidelines

When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

1) Leakage Current Cold Check
2) Leakage Current Hot Check
3) Prevention of Electro Static Discharge (ESD) to Electrostatic Sensitive

1-2. Insurance test

1. Check if there is any leak of current.
2. Cut out the power supply before the repair to avoid an electrical shock hazard.
3. In the case of a live-line test, insulating gloves should be worn to avoid potential electrical shock.
4. Confirm the rated current, voltage and capacity before testing with any kinds of instruments.
5. Watch if the upper door is open when you check something at a lower position.
6. Take out every part in the cabinet before moving the machine, especially things like panels (e.g. glass shelf).
7. Please wear intact cotton gloves when repair any parts of the evaporator, so that scratches by the sharp fins can be avoided.
8. If there is a breakdown with the refrigeration system, please surrender the machine to the service center, else the leaked refrigerant may pollute the atmosphere.
9. The refrigerator use AC of 220V with a frequency of 50Hz.
10. A big fluctuation of voltage (exceed the range 187～230V) may cause a start failure of the refrigerator, a burn-out of the control panel and compressor, or an abnormal sound from the compressor in operation. In this condition an automatic voltage regulator over 60W should be added.
11. Take care not to damage the supply line. Don’t yank at the line; pull the plug out gently from the receptacle. Don’t press the line under the cabinet or step on it. Take care not to roll on or damage the supply line when moves the machine from the wall.
12. In the case of leakage of inflammable gases like carbon monoxide, open the door and windows. Don’t pull out or insert the plugs of the appliance.
13. Don’t touch the refrigeration surface of the freezing compartment when the refrigerator is in operation, especially when your hand is wet, else you may be glued to the surface.
14. Pull out the plug of power supply during clearance or power outage. Wait at least five minutes to resume the power supply in order to prevent damage to the compressor caused by continuous restart.

Photo used in this manual

The illustration and photos used in this Manual may not base on the final design of products, which may differ from your products in some way.

1-3. How to read this Service Manual

1-3-1. Using Icons

The meaning of each icon is described in the table below:

Note:

A “note” provides information that is not indispensable, but may nevertheless be valuable to the reader, such as tips and tricks.

Caution:

A “caution” is used when there is danger, through incorrect manipulation, may damage equipment, loose data, get an unexpected result or has to restart (part of) a procedure.

Warning:

A “warning” is used when there is danger of personal injury.

Reference:

A “reference” guides to other places in this binder or in this manual, where we will find additional information on a specific topic.

Chapter 2 Product Feature

2-1. SPECIFICATIONS

1	Models		AFL 631 CW/U AFL 631 CB/U AFL 631 CS/U	CFE 633 CW/U CFE 633 CB/U CFE 633 CS/U
	Sketch			
	Product description (Refrigerator/Freezer)		Refrigerator	Refrigerator
	Type of appliance (FS= freestanding/BI= built-in)		FS	FS
	Type of cooling system(NF=no frost/ S=static)		NF	NF
	Climate class*		SN-T	SN-T
	Freezer compartment / Star rating		4*	4*
2	Key features			
	Gross capacity	L	340	342
	Total net capacity	L	308	310
	Net capacity refrigerator compartment	L	230	230
	Net capacity freezer compartment /ice compartment	L	78	106/80
	Freezing capacity	kg	11kg	11kg
	Max storage time at breakdown *Freezer*	Hour	16	16
	Defrosting (M=manual A=automatic)		A	A
	Frost free system		yes	yes
	Defrost water outlet		yes	yes
	Air circulating ventilator		yes	yes
	Kind of coolant (R134a/R600a)		R600a/ 55g	R600a/ 52g
3	Technical data			
	Voltage / frequency	V/Hz	220-240~/ 50	220-240~/ 50
	Input power / mains fuse minimum	W /A	100/ (DC)	100/ (DC)
	Temperature range (from>to)	°C		
	Refrigerator		1-8°C	1-8°C
	Chiller / Meat Crisper		~0°C / -	- / 3-10°C
	Vegetable Crisper		0-10°C	0-10°C
	Freezer		-16 ~-25°C	-16 ~-25°C
	Energy consumption per l 100 net / year	kWh	0.282	0.260

	Energy consumption per l 100 net / 24h	kWh	0.87	0.87
	Cooling system: K=Compressor / A=Absorption		K	K
	Max noise level	dB(A)	42	42
4	Aesthetics			
	Colors: W=white G=silver gray SS=stainless steel		W/B/G	W/B/G
	F= flat / R= rounded / S= streamline		R	R
	Inside colour		w	w
	Compartments number	n°	3	2
	Bottle compartment	n°	4	4
	Hinged (r =right l =left) / reversible		r / X	r / X
	Shelves:			
	Number Fridge / Freezer		3 / -	3 / -
	Type (gr=grill / g=glass / p=plastic)		g / -	g / -
	Color w-white / b=blue / t=transparent.		t	t
	Adjustable (Y=yes / N=not)		yes	yes
	Foldable Shelf		yes	No
	Bottle Rack		yes	No
	Drawers:			
	Plastic drawers (fully freezing comp.)	n°.	2	2
	Half freezing comp	n°.	2	1
	Colour of drawer (w=white/t=transp./g=green)		w/t	t
	Crisper:			
	Chiller / Meat (salad crisper) transparent / white		Chiller (t)	Chiller (t)
	Vegetable crisper(s) transparent / white		t	t
5	Equipment & accessories			
	Interior / exterior		Interior	Interior
	Thermometer interior / exterior		Interior	Interior
	Display type		LED	No
	Control lamps green / yellow /white		g&y	No
	Over temperature alarm LED / acoustic		acoustic	acoustic
	Adjustable thermostat		yes	yes
	Fast freeze switch /-function		yes	yes
	Deodorizing		yes	No
	Interior light	W	yes	yes
	LED light	n°	Full	/
	Freeze pack(s)	n°	2	3
	ice maker Manual/ Automatic		/	/
	Ice cube tray(s)	n°	1	1
	Butter holder		yes	/
	Egg trays		2	/
	Adjustable feet front / rear	n°	2 / -	2 / -
	Length of cable/incl. plug	cm	200	200

	Condenser Back wall / Integrated		B	B
6	Product dimensions			
	Unit dimensions (*H / W / D)*	cm	188/59.5/67	188/59.5/67
	Depth Without handle	cm	67	67
	Depth with open door	cm	1188	1188
	Door open angle	n°	<135	<135
	Net weight	kg	81	76
7	Packing dimensions & load ability			
	Packing dimensions (*H / W / D)*	cm	194.7/66.4/73	194.7/66.4/73
	Gross weight	kg	91	86
	40 ' Container load	pcs	48	48
	40 ' HC Container load	pcs	63	63
8	Recycling symbols			
	Packing materials / Recycling symbols (RS)	RS	RS	RS
	Carton *weight in gr*		6270	6270
9	Service			
	Users instruction *(languages)*		English	

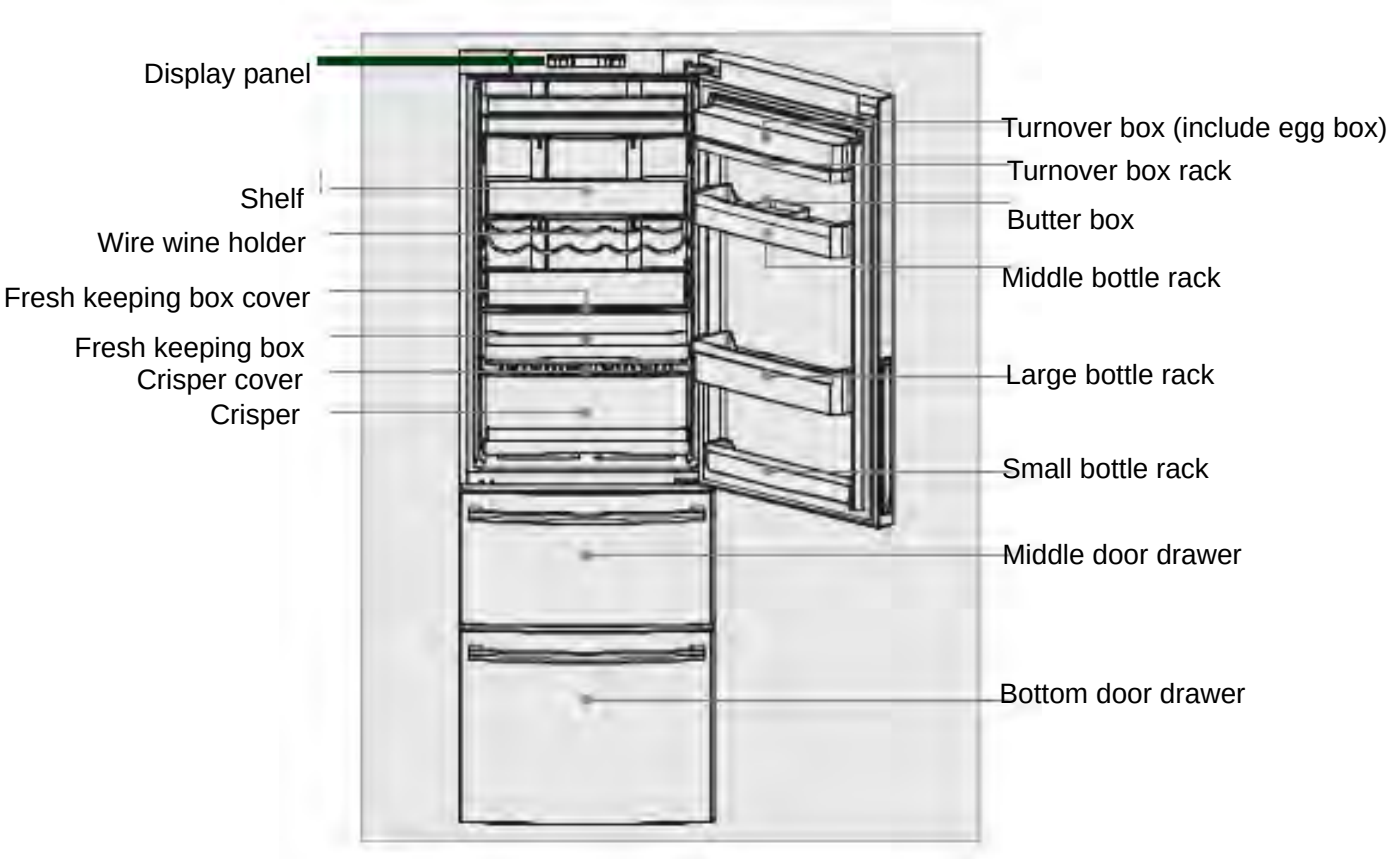
2-2 Main Functions and Features

- Energy saving and convenience
- Half-shelf structure.
- Innovative long-efficiency lighting system.
- Foldaway wine holder.
- Large crisper with humidity adjustment.
- Holiday function.
- Power ON/OFF function is set on the display panel (only in some models).
- Fridge storage compartment can be set on/off separately.
- Intelligent alarm function: automatic alarm at over temperature, malfunction, door open.
- Touch keys (only in some models).
- Deodorizer (only in some models).
- Zero degree fresh keeping.

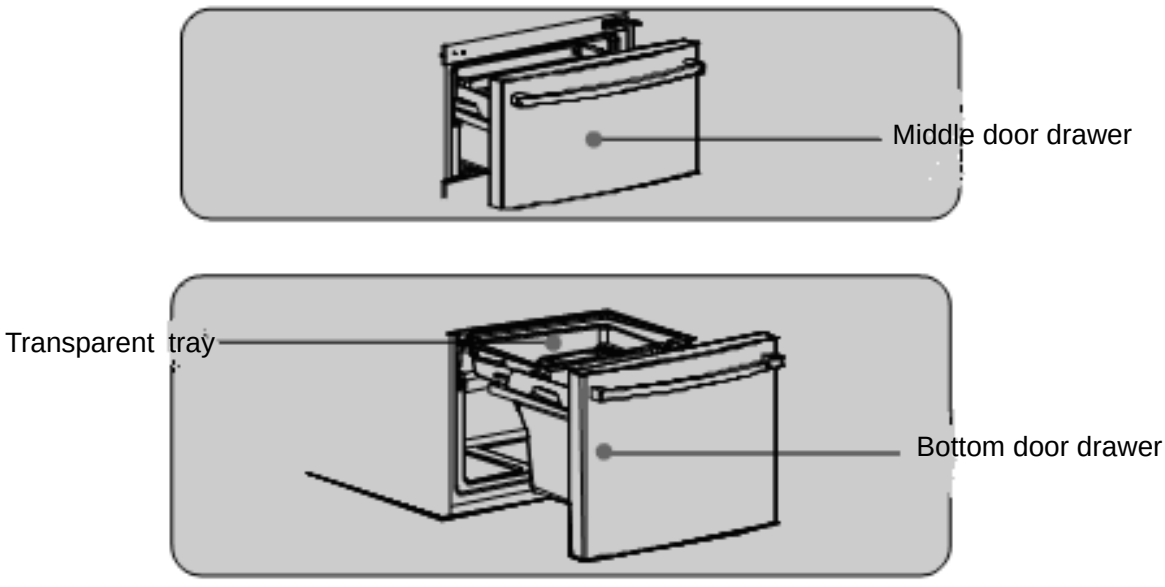
2-3. External views

2-3-1 Three-Door Refrigerator Structure

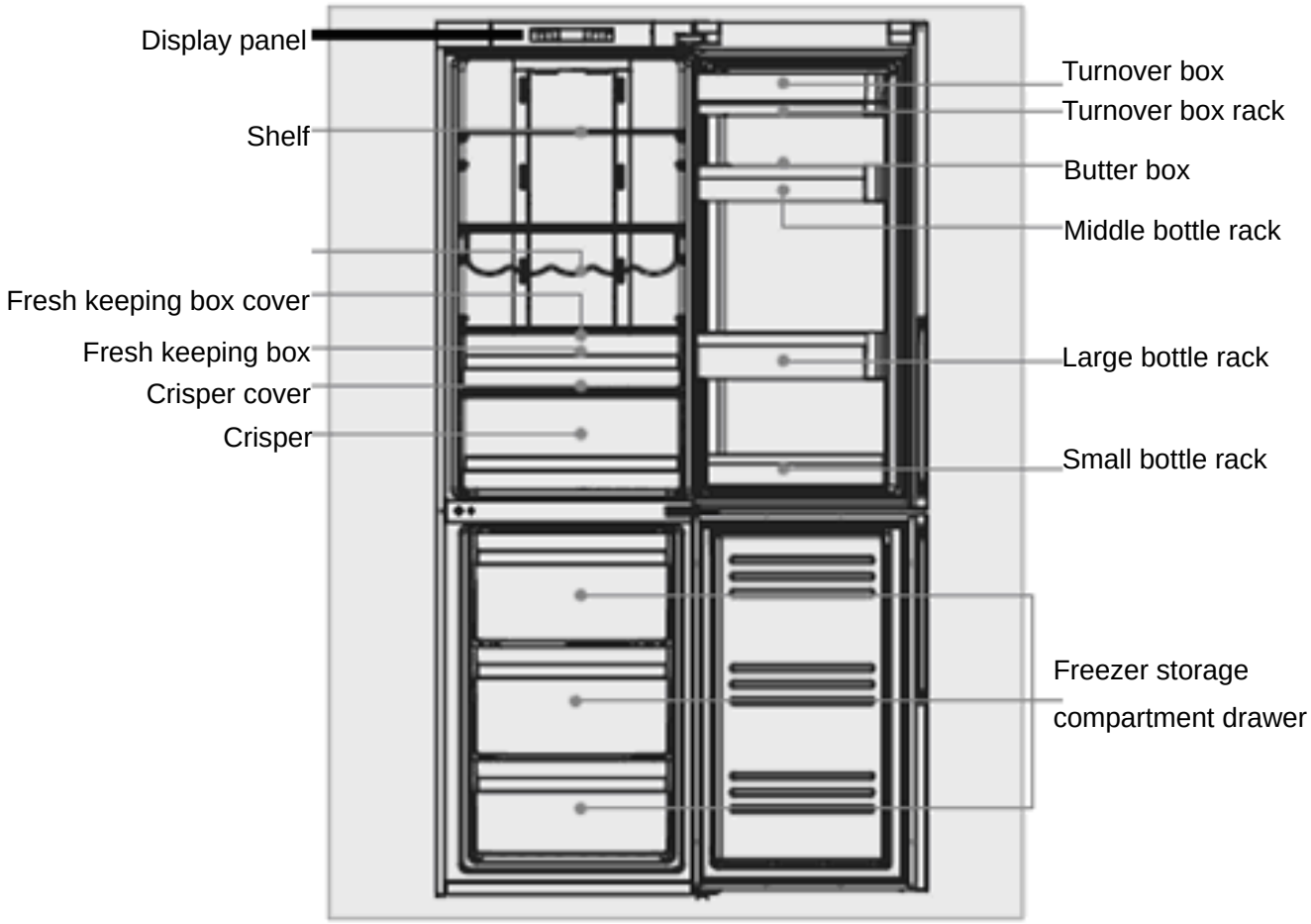
Fridge storage compartment



Freezer Drawer Structure



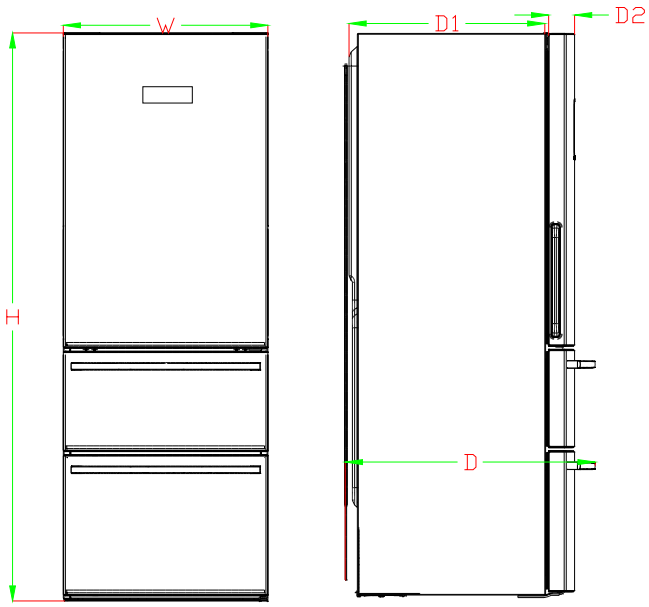
2-3-2 Two-Door Refrigerator Structure



2-4. Product Dimensions

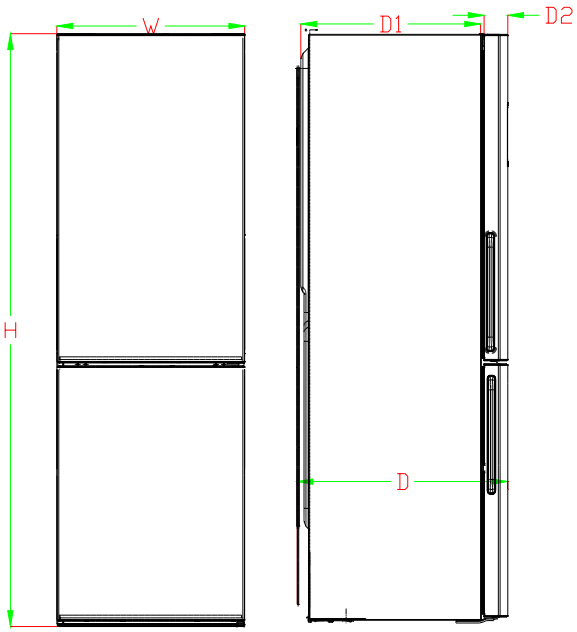
Three-Door Refrigerator Dimensions:

Refrigerator height H=1880mm
Refrigerator width W=595mm
Refrigerator depth D=730mm
Cabinet depth D1=576mm
Door depth D2=78mm



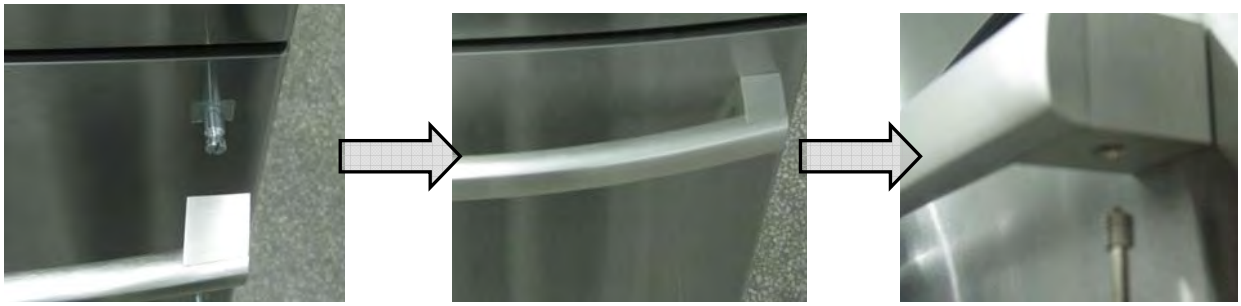
Two-Door Refrigerator Dimensions:

Refrigerator height H=1880mm
Refrigerator width W=595mm
Refrigerator depth D=670mm
Cabinet depth D1=576mm
Door depth D2=78mm



Chapter 3 Disassembly

3-1 Installing the Freezer Drawer Handle



(1) Take the handle from the packing bag and align it with the handle seat on the door.

note: the screw hole on the handle should be facing downward.

(2) Secure it with the screw from the bottom.

3-2 Installing and Removing Door

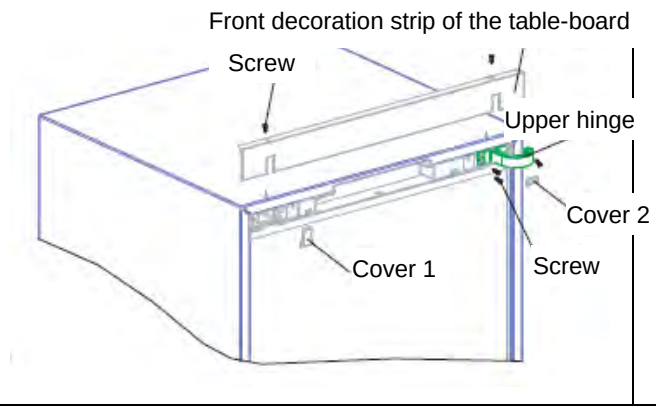
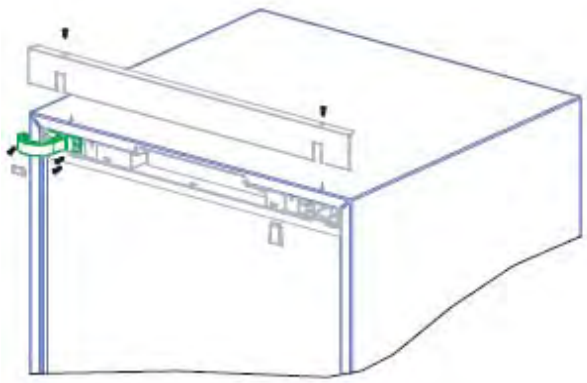
Precautions During Dismantling and Installation of The Door

(1) Before removing the doors, please remove food from the shelves and the bottle guards. Then, unplug the refrigerator power cord to avoid personal injury, product damage or property loss.

(2) During dismantling of the door, in order to avoid possible personal injury, product damage or property loss, at least two adults are needed to perform the following operations.

(3) While lifting the hinges to separate it from the door, please take care to prevent the door from falling forward.

3-2-1 Dismantle and install front decoration strip of the table-board and the upper hinge

PART-1 Before change	After change
	

(1) Pull decoration covers 1 and 2 downward to remove them and retain.

(2) Detach the 2 screws fixing the front decoration strip of the table-board.

(3) Lift the front decoration strip of the table-board outward and upward. At this time, there are wires connecting it. Please do not disconnect the wires. Gently put the front decoration strip on the top of the refrigerator.

(4) Detach the screws affixed to the upper hinge and remove the hinge.

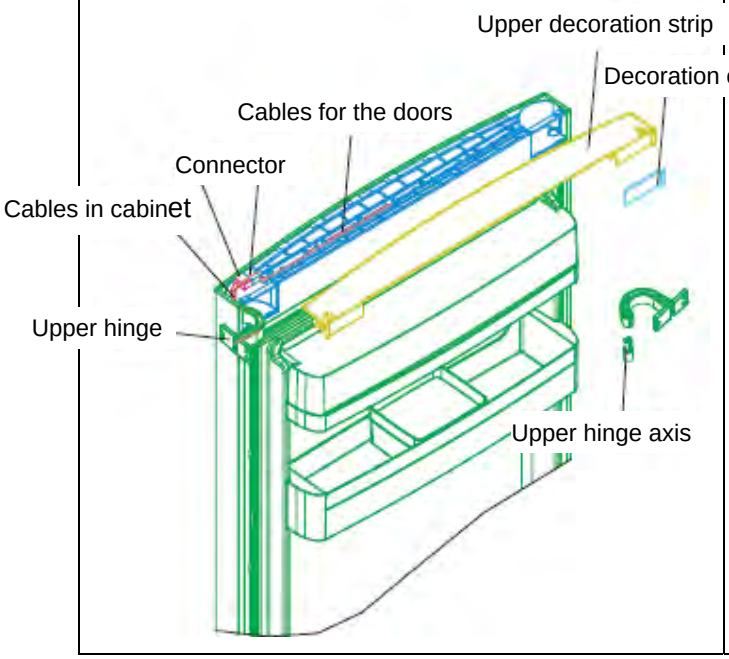
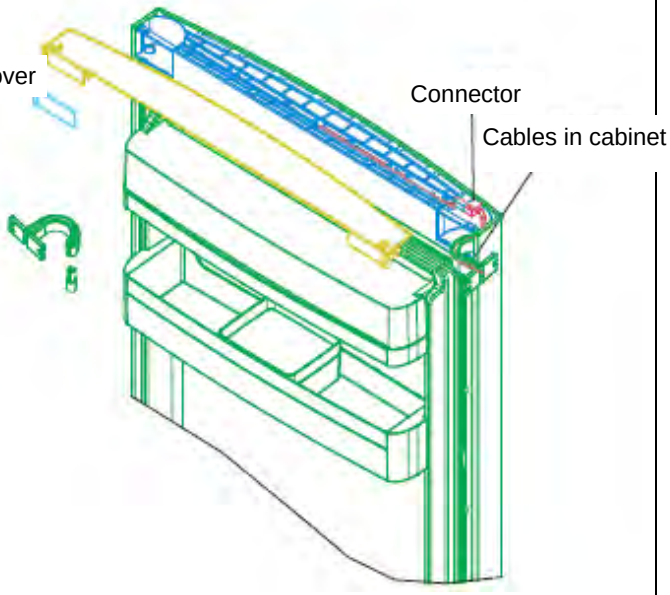
(5) Turn over the upper hinge and fix it on the other side. Then, install the front decoration strip of the table-board in the reversed direction.

(6) Secure the 2 screws on the top.

(7) Install the 2 decoration covers on the front decoration strip of the table-board with their positions exchanged.

Note: for the models with cabinet display, the front decoration strip of the table-board is different from the one shown in the figure. The dismantling and installation methods are the same.

3-2-2 Dismantle and install the upper decoration strip and cables

PART-2 Before change	After change
	

(1) Remove the decoration covers from the door and retain.

(2) Remove the upper decoration strip from the door. Insert a “-”screwdriver into the decoration strip at the position shown by the arrow and lightly pull the screwdriver handle in the arrow direction while pulling the decoration strip upward with another hand. In this way the decoration strip will detach away from the door. The operation methods on the right side and the left side are the same.

(3) Disconnect the connectors and pull out the cables in the door conduit and the cables in the upper hinge conduit respectively.

(4) Loosen the screws affixed to the upper hinge to remove the hinge. At the same time, the refrigerating compartment door can be lifted up and separated from the middle hinge.

(5) Pull the axis from the upper hinge. Then, insert it from the other end of the upper hinge. Insert the upper hinge by placing the axis into the door axis hole after turning 180 degrees.

(6) Remove the stop block on the bottom of the door and then reatacht on the other side of the door after turning 180 degrees.

(7) Turn the middle hinge by 180 degrees and then fit it on the other side of the cabinet.

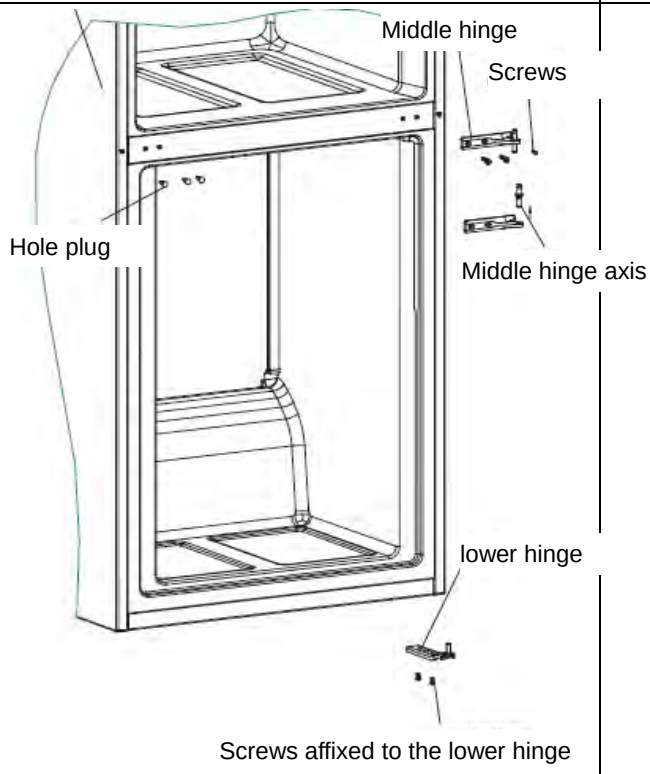
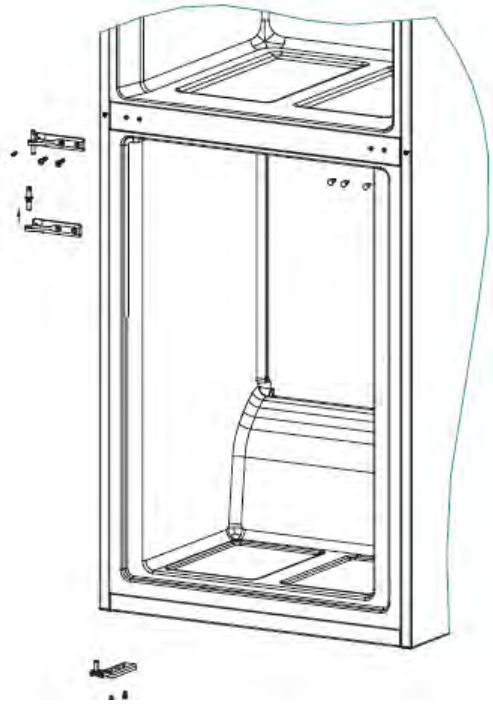
(8) Hang the door on the middle hinge and secure the hinge's screws. Connect the two connectors together. Tuck the cables for the door into the conduit on the other side of the door and the cables for the cabinet into the upper hinge conduit.

(9) Tuck the connected connectors into the conduit on the upper decoration strip and joint the upper decoration strip on the door.

(10) Turn the decoration piece by 180 degrees and insert it between the door and the upper decoration strip at the other side of the cabinet.

Note: for the models with cabinet display, the above operation concerning cables is not needed.

3-2-3: Dismantle and install the middle and lower hinges

PART-3 Before change	After change
	

(1) Detach the 3 screws affixed to the middle hinge and remove the hinge. Unscrew the hinge axis and then screw it from the reversed direction.

(2) Remove the upper and lower doors separately. Dismantle the stop blocks on the bottom of the doors. Turn them by 180 degrees and refit them on the other side.

(3) Tilt the refrigerator to the required angle. Detach the screws fixing the lower hinge and remove the

hinge.

(4) Fix the lower hinge to the bottom of the other side of the cabinet. Then, mount the lower door on the lower hinge.

(5) Take out the 3 hole plugs on the other side of the cabinet.
Turn the middle hinge by 180 degrees and install it on the other side of the cabinet. Attach the 3 screws removed in step 1. Mount the 3 hole plugs into the holes where the hinge is seated originally.

Note: For 3-door refrigerators, the operation concerning the lower hinge is not needed.

3-3 Removing the Freezer Drawer

(1) Open the freezer storage compartment door of the 3-door refrigerator;

(2) Take out the drawer;

(3) Detach the screw connecting the rail and the support iron (the screw may be on the inner side of the support iron due to the rail);

(4) Remove the door.

3-4 Removing the Cabinet Display Panel

① ② ③

④ ⑤ ⑥

(1) Open the fridge door (fig. ①);

(2) Remove the two small decorative covers of the cabinet (fig.②);

(3) Detach the screws fix on the top cover of the cabinet (fig.③);

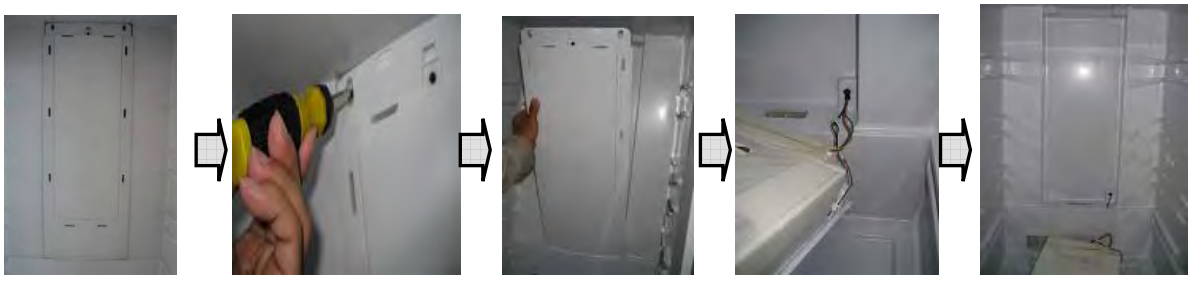
(4) Remove the top cover of the cabinet (fig.④);

(5) Pull out the connector and remove the front decoration strip of the table-board (fig. ⑤⑥).

3-5 Removing the Air-Duct

Unplug the refrigerator before removing the air-duct

3-5-1 Removal of fridge air-duct



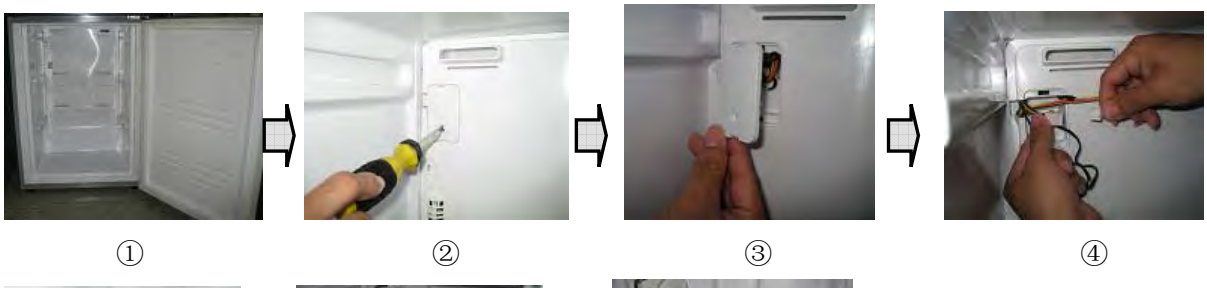
① ② ③ ④ ⑤

(1) Take out the accessories in the fridge storage compartment which may interfere with the removal of the air-duct (including shelves, large and small crispers, air-duct decoration strips) (fig. ①);

(2) Detach the 2 screws in the upper part of the air-duct (fig. ②);

(3) Tilt the refrigeration air-duct forward entirely around its upper side until you can see the connector on its lower side. Pull out the connector and you can remove the refrigeration air-duct (fig. ③④⑤);

3-5-2 Removal of freezing air-duct



① ② ③ ④

⑤ ⑥ ⑦

(1) Take out the accessories in the freezer storage compartment which may interfere with the removal of the freezing air-duct (drawers of 2-door models, middle/bottom doors and drawers of 3-door models) (fig ①);

(2) Detach the screw in the harness cover over the freezing air-duct; (fig ②);

(3) Remove the harness cover. There is a small indentation on both upper side and bottom side of the harness cover to facilitate the removal (fig ③);

(4) Pull out the wires under the harness cover and pull out the connector (fig ④);

(5) Detach the 2 screws in the freezing air-duct onto the freezer chamber (fig ⑤);

(6) Tilt the freezing air-duct forward from top to bottom and you can remove the air-duct (fig ⑥);

(7) Take out the freezing air-duct and the fin evaporator is just behind it (fig ⑦).

When reinstalling, please connect the connector first and then mount and fix the freezing air-duct.

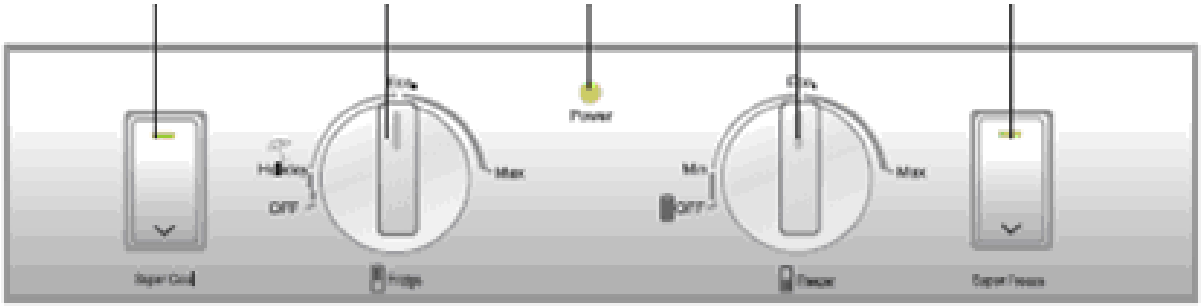
Chapter 4 Control and display system

4-1. Control and display panel

4-1-1 Models: CFE633*

Control panel

Super cooling button | Fridge storage temperature setup knob | Power indicator | Freezer storage temperature setup knob | Super freezing button



■ Initial powering on

Upon initial powering on, the power indicator will illuminate. There will be alarm due to high temperature in the freezer storage compartment. You can cancel the alarm by pressing any key.

■ Fridge storage temperature setup

The temperature in the fridge storage compartment can be set by turning the fridge storage temperature setup knob. There are three temperature positions for refrigerating: Holiday, Moderate and Super Cool.

■ Freezer storage temperature setup

The temperature in the freezer storage compartment can be set by turning the freezer storage temperature setup knob. There are three temperature positions for freezing: Weak, Moderate and Super Freeze.

■ Super cooling

Select this function after you have put fresh food in the fridge storage compartment. Press the super cooling button, the refrigerator activates this function and corresponding indicator illuminates. This function will automatically deactivate when the temperature decreases to the required level. You can also deactivate it by pressing the super cooling button again.

■ Super freezing

Select this function after you have put large amount of food in the freezer storage compartment. Press the super freezing button, the refrigerator activates this function and corresponding indicator illuminates. This function will become automatically deactivate after 24 hours. You can also deactivate

it by pressing the super freezing button again.

■ Holiday function

Turning the fridge storage temperature setup knob to “Holiday” will activate the holiday function of the fridge storage compartment. It will operate at a relatively high temperature. (Please remove any fresh food from the fridge storage compartment and close the door before activating this function)

■ Display control

The display screen will turn off automatically 1 minute after an operation is finished. It will be lit up by opening the door or pressing any key. (Alarm does not light up the display screen)

■ Door open alarming

When the refrigerator door is open for more than 3 minutes, the super cooling indicator will flash and the buzzer will sound 3 beeps every 30 seconds. The buzzer can be silenced by closing the door or pressing any key.

■ Over temperature alarm

When the temperature in the freezer storage compartment rises to a certain value, the Super Freeze indicator will flash and the buzzer will sound 1 beep every second. The buzzer may be silenced when the temperature in the freezer storage compartment drops to a specified level or by pressing any key.

■ Turning off the fridge storage compartment

Set the fridge storage temperature to OFF. The fridge storage compartment will be turned off while the freezer storage compartment operates normally.

■ Turning off the refrigerator

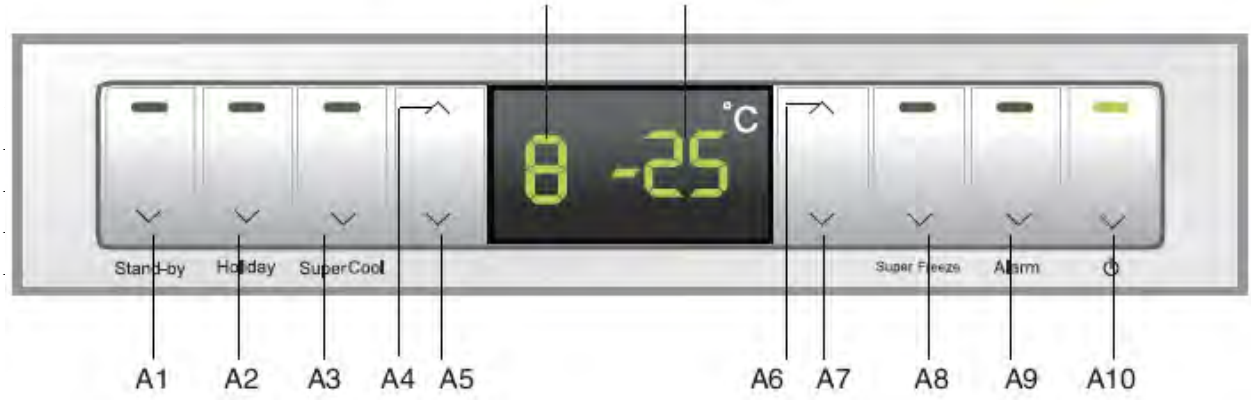
Set the freezer storage temperature to OFF. The refrigerator will stop operating.

This function is not equivalent to turning off the power.

4-1-2 Models: AFL631*

Control panel

Fridge storage compartment temperature Freezer storage compartment temperature



■ Initial powering on

When the refrigerator is powered on for the first time, the power indicator and the fridge storage compartment indicator will light. The fridge storage temperature will be displayed as “-” due to the high

temperature inside. The freezer storage temperature will be displayed as“- -” due to high temperature inside. The buzzer will beep. Press key A9, and the buzzer will be silenced. After the temperature decreases to certain level, the displayed temperatures of the fridge storage compartment and the freezer storage compartment will become the ex-factory settings “5” and “-18” respectively.

■ Fridge storage temperature setup

Press key A4 or A5 to set the fridge storage temperature. The fridge storage temperature cycles from 1 to 8. The setting is confirmed automatically 5 seconds after the operation is finished or by pressing any other key.

■ Freezing storage temperature setup

Press key A6 or A7 to set the freezer storage temperature. The freezer storage temperature cycles from -14 to -26℃. It will be confirmed automatically 5 seconds after the operation is finished or by pressing any other key.

■ Super cooling

Select this function after you have put fresh food in the fridge storage compartment. Press key A3, and this function is activated and the corresponding indicator illuminates. This function will automatically deactivate when the temperature decreases to the required level. You can also deactivate it by pressing key A3 again.

■ Super freezing

Select this function after you have put large amount of food in the freezer storage compartment. Press key A8, this function is activated and the corresponding indicator illuminates. This function will become inactive automatically after 24 hours. You can also deactivate it by pressing key A8 again.

■ Holiday function

Press key A2, corresponding indicator illuminates and the holiday function of the fridge storage compartment is activated. It will operate at a relatively high temperature in Holiday mode. The fridge storage temperature will be indicated as “-” (Please take out the fresh food in the refrigerator and close the door before activating this function). Press key A2 again, and the corresponding indicator goes off and the refrigerator comes into normal control.

■ Display control

The display screen will turn off automatically 1 minute after an operation is finished. It can be lit up by opening the door or pressing any key. (Alarm does not light up the display screen)

■ Door open alarming

When the refrigerator door is open for more than 3 minutes, the alarm indicator will flash and the buzzer will sound 3 beeps every 30 seconds. The buzzer can be silenced by closing the door or pressing key A9.

■ Over temperature alarm

When the temperature in the freezer storage compartment rises to a certain value, the alarm indicator will illuminate solid and the buzzer will sound 1 beep every second. The buzzer can be silenced when the temperature in the freezer storage compartment drops to a specified level or key A9 is pressed.

■ Turning off the fridge storage compartment

Press and hold key A1 for 3 seconds, and the corresponding indicator will turn off and the fridge storage compartment will be turned off while the freezer storage compartment operates normally. The fridge storage temperature indication icon will also go off. Press and hold key A1 for 3 seconds again, the corresponding indicator will illuminate, the fridge storage compartment will be turned on, and the fridge storage temperature indication icon will recover.

■ Turning off the refrigerator

Press and hold key A10 for 3 seconds, corresponding indicator will go off, the display panel will go off and the refrigerator will stop operating.

Press and hold key A10 for 3 seconds again, corresponding indicator will light up, the display panel will light up, and the refrigerator will start operating normally.

This function is not equivalent to turning off the power.

■ Fault indication

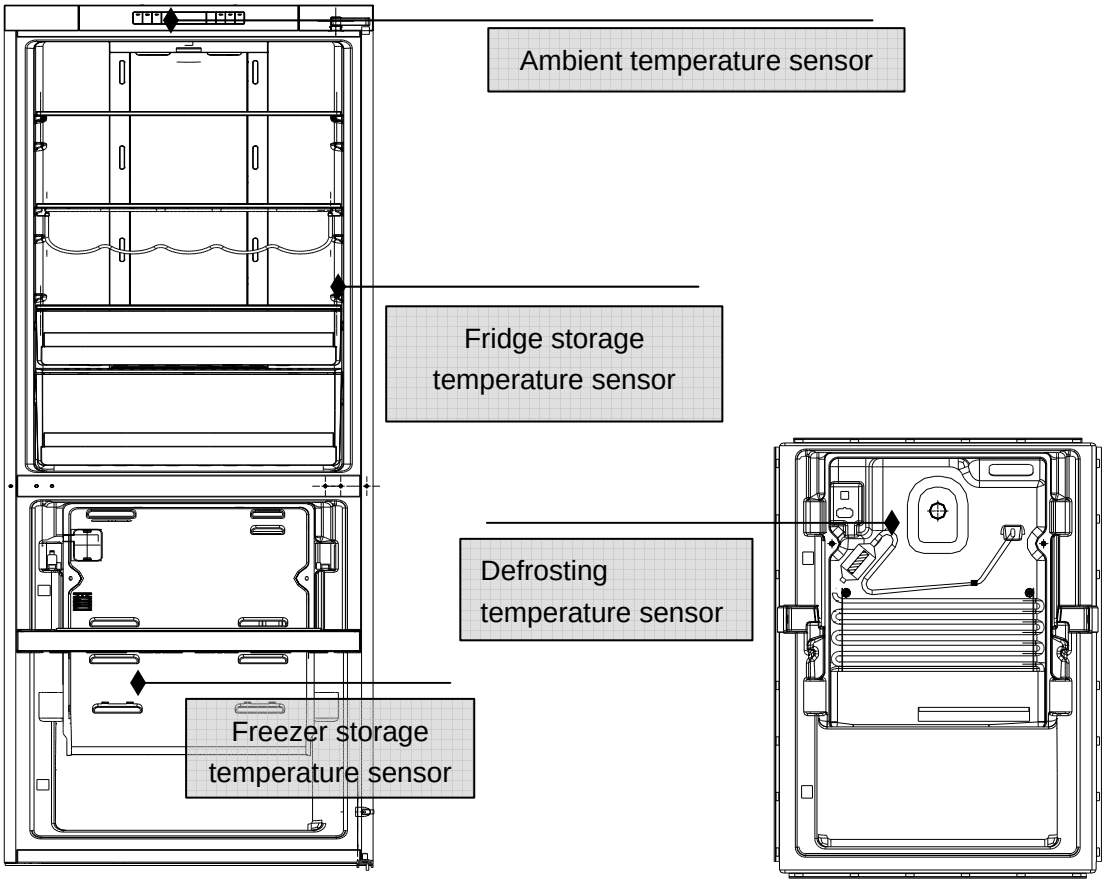
When E or F is displayed due to fault, the refrigerator can still refrigerate. Please contact professional after-sales service personnel as soon as possible.

4-2 Error code display and sensor positions

4-2-1 Sensor location description

Malfunction description	Sign	Display	Display position	Sensor location
Malfunction of the ambient temperature sensor	H SNR	F2	Display panel	The ambient temperature sensor is located on the display panel
Malfunction of the fridge storage temperature sensor	R SNR	F3	Display panel	The fridge storage temperature sensor is located on the right side of the fridge storage compartment
Malfunction of the freezer storage temperature sensor	F SNR	F4	Display panel	The freezer storage temperature sensor is located on the left side of the freezing air-duct cover
Malfunction of the defrosting temperature sensor	D SNR	F6	Display panel	The defrosting temperature sensor is located on the fin evaporator
Malfunction of communication between the display panel and the power board	/	E0	Display panel	/
Malfunction of the fan	/	E1	Display panel	/

4-2-2 Graphic display of the sensor location



4-3. Self test model

TEST1：Press the TEST key on the power board to enter the (PULL DOWN MODE), the door display panel displays T1 T1 and the refrigerator enters forced refrigeration state: the compressor operates normally, the fan runs at high speed, and the defrosting heating wire is disconnected. This can be used to test the refrigeration performance.

TEST2：Press TEST key again in TEST1 MODE to enter the (FORCED DEFROSTING MODE). It will act depending on the temperature sensed by the defrosting sensor When the temperature sensed by the defrosting sensor is over 10℃, the heating wire will exit the (FORCED DEFROSTING MODE)after 20s' heating When the temperature sensed by the defrosting sensor is below 10℃, the heating wire will heat continuously until the temperature sensed by the sensor reaches 7℃ In the (FORCED DEFROSTING MODE), the door display panel displays T2 T2, the refrigerator conducts forced defrosting, the compressor and the fan are turned off, and the defrosting heating wire is turned on. At this moment, you can test the power of the defrosting heating wire and it should be 153±15W.

Chapter 5 Control principle of electronic component

5-1. **Air Escaper**

(1) The refrigeration air door is controlled with the fridge storage temperature sensor R SNR.
(2) The air door is closed from the beginning of defrosting until 15 minutes after the defrosting is finished.
(3) Upon initial powering on or resetting of the control panel, the air door conducts a close-and-open cycle before acting according to the control conditions in item (1).
(4) The air door will be forced to conduct an open-and-close cycle if it has been closed for 1 hour. After that, its closing/opening will be controlled by R SNR.
(5) If the temperature is still rising (or dropping) within 10 minutes after opening (or closing) of the air door, it will open (or close) once again.

5-2. **Control Principle of the Fan**

The freezer fan is controlled by the control panel according to the following conditions. The DC fan's rotation speed is regulated with PWM mode and the AC fan operates directly.

(1) ON/OFF condition of the freezer fan (The control mode of the DC fan is listed in the table below. The AC fan runs under condition ON and stops running under condition OFF):
(2) When the fridge storage compartment door is opened, the freezer fan will run and the refrigeration air door will open. After 2 minutes, the refrigeration air door will close;
(3) When the freezer storage compartment door is open, the freezer fan will not run;
(4) Conditions for judging LOCK of the freezer fan: If the rotation speed of the fan is less than 300RPM or the fan does not run and the state has persisted for over 30 seconds, a freezer fan malfunction will be displayed. Normal display will be recovered after it becomes normal. Otherwise the freezer fan malfunction will persist.

5-2. **Defrosting Control Principle**

(1) A defrosting cycle will be started once the compressor has operated for 8 hours accumulatively. It will stop defrosting when the defrosting sensor detects a temperature over 10ºC.
(2) The compressor stops and the refrigeration air door is closed during defrosting.
(3) After initial powering on or resetting of the control panel, it will start the first defrosting cycle after the compressor has operated for 6 hours accumulatively.
(4) It may enter the defrosting state when the defrosting sensor is malfunctiony (short-circuit or open-circuit). In this case, it will exit the defrosting state after 30 minutes.

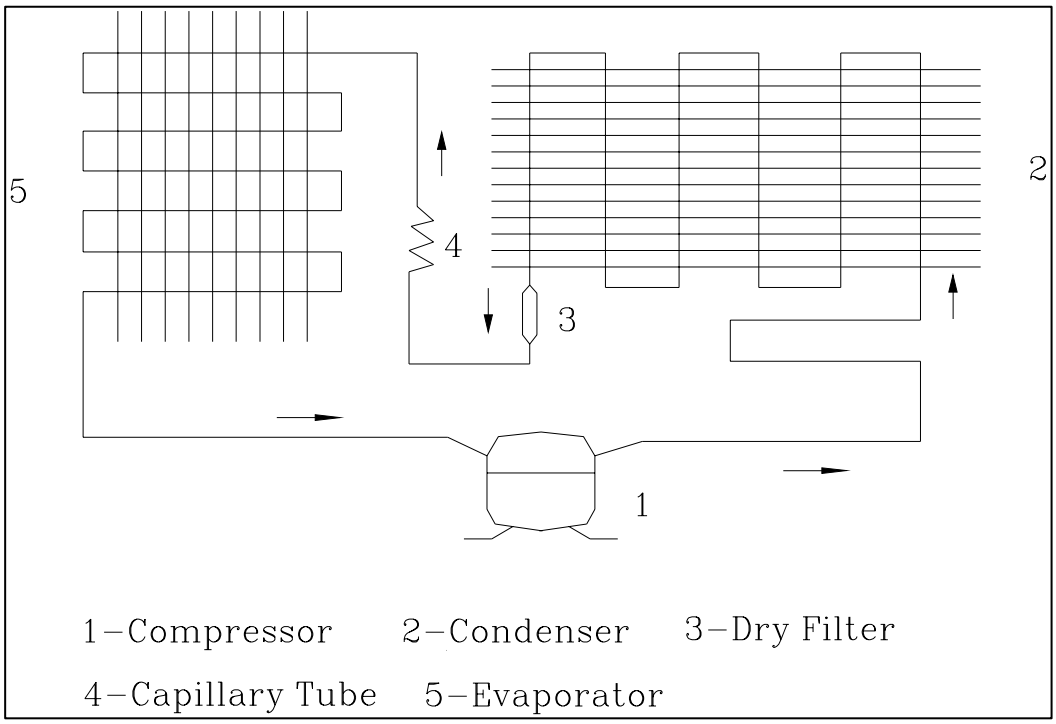
Chapter 6 System flow principle

6-1. Refrigeration flow chart

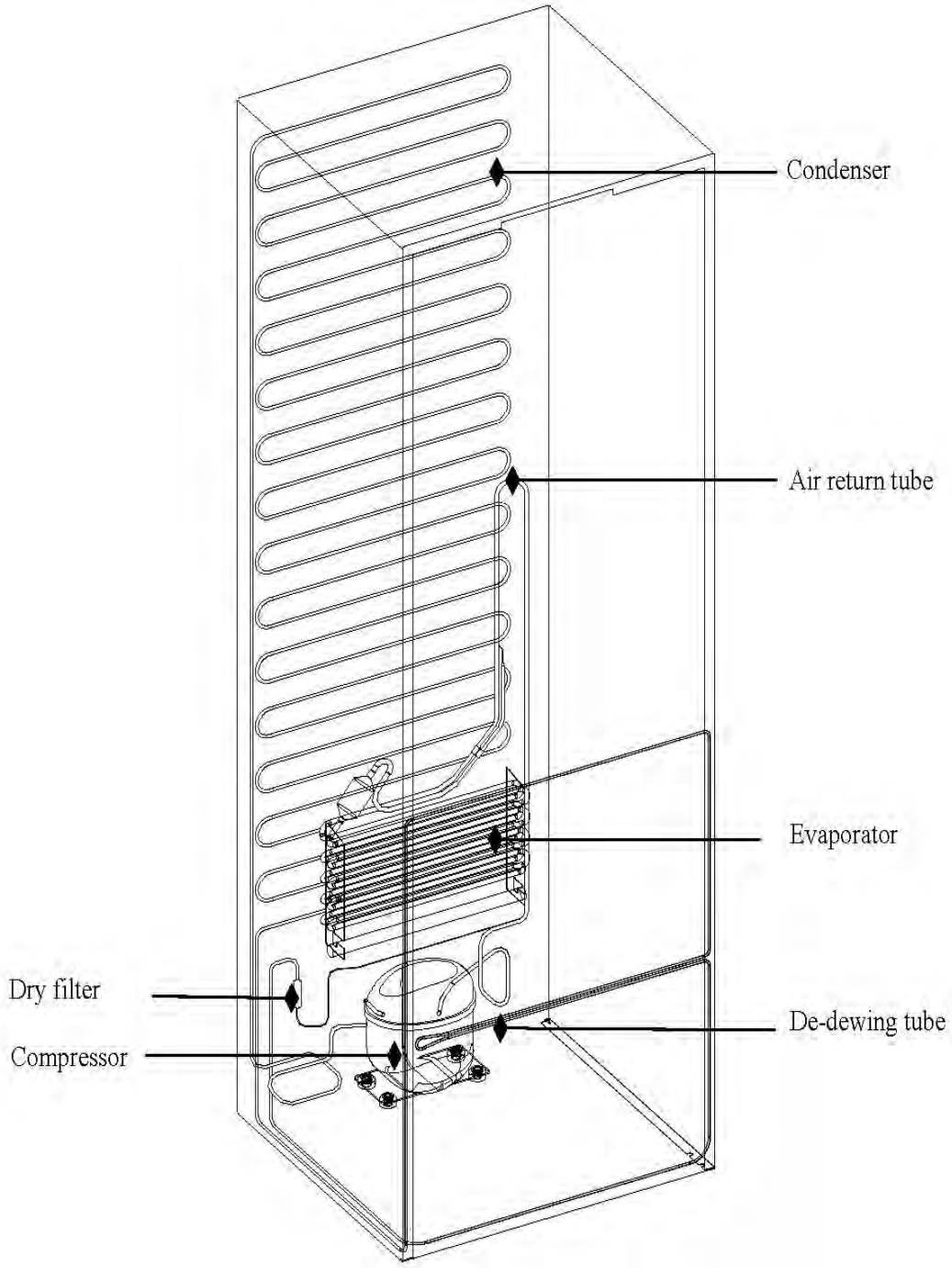
Principle diagram and description of the refrigeration cycle

The refrigerant is compressed in the compressor, from there, it enters the dry filter, de-dewing tube, and the condenser, and goes into the evaporator after being throttled and decompressed in the capillary tube. Finally, it returns to the compressor through the air return tube.

Principle diagram of the refrigeration cycle:

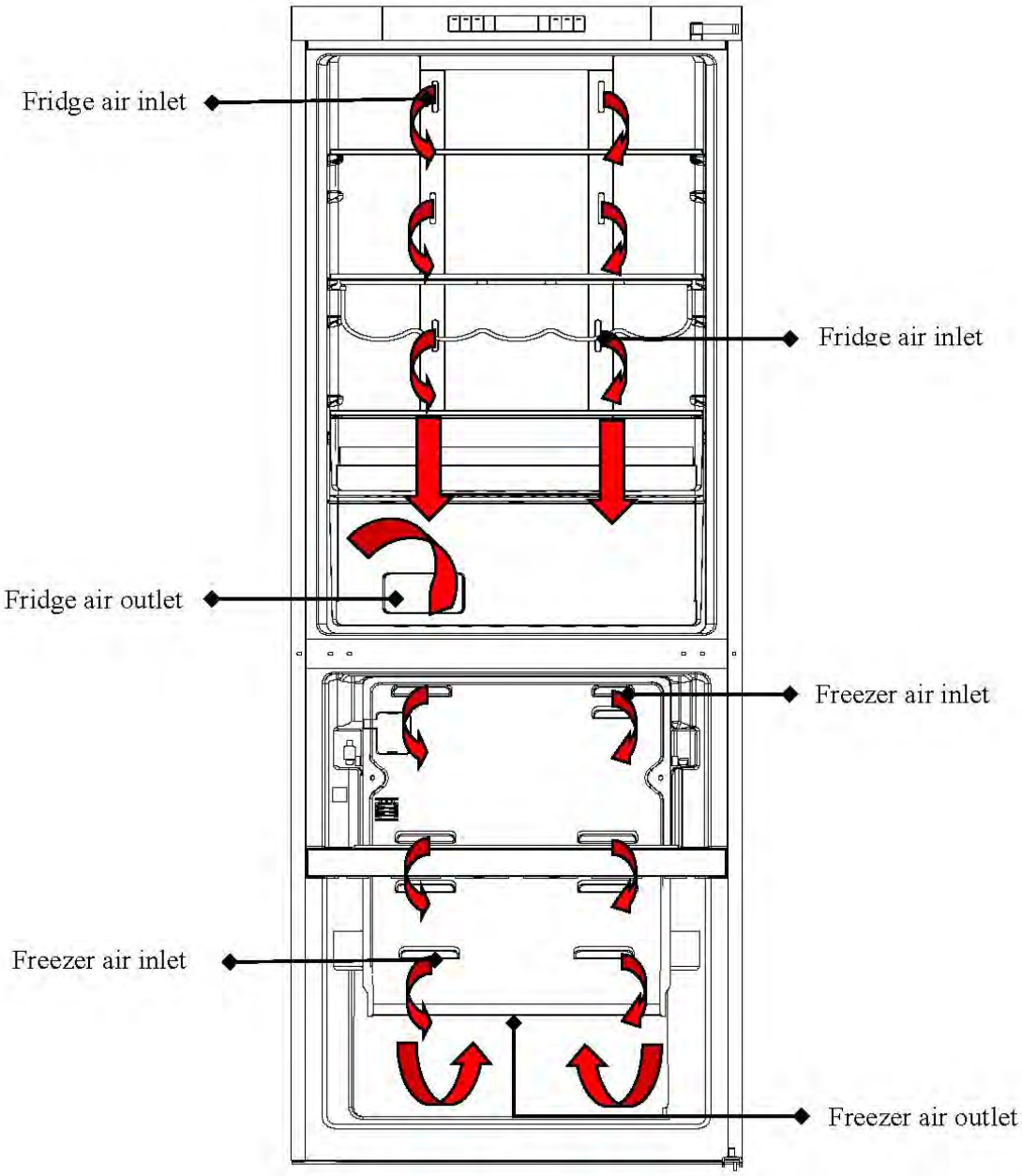


6.2. Perspective of the Refrigeration System



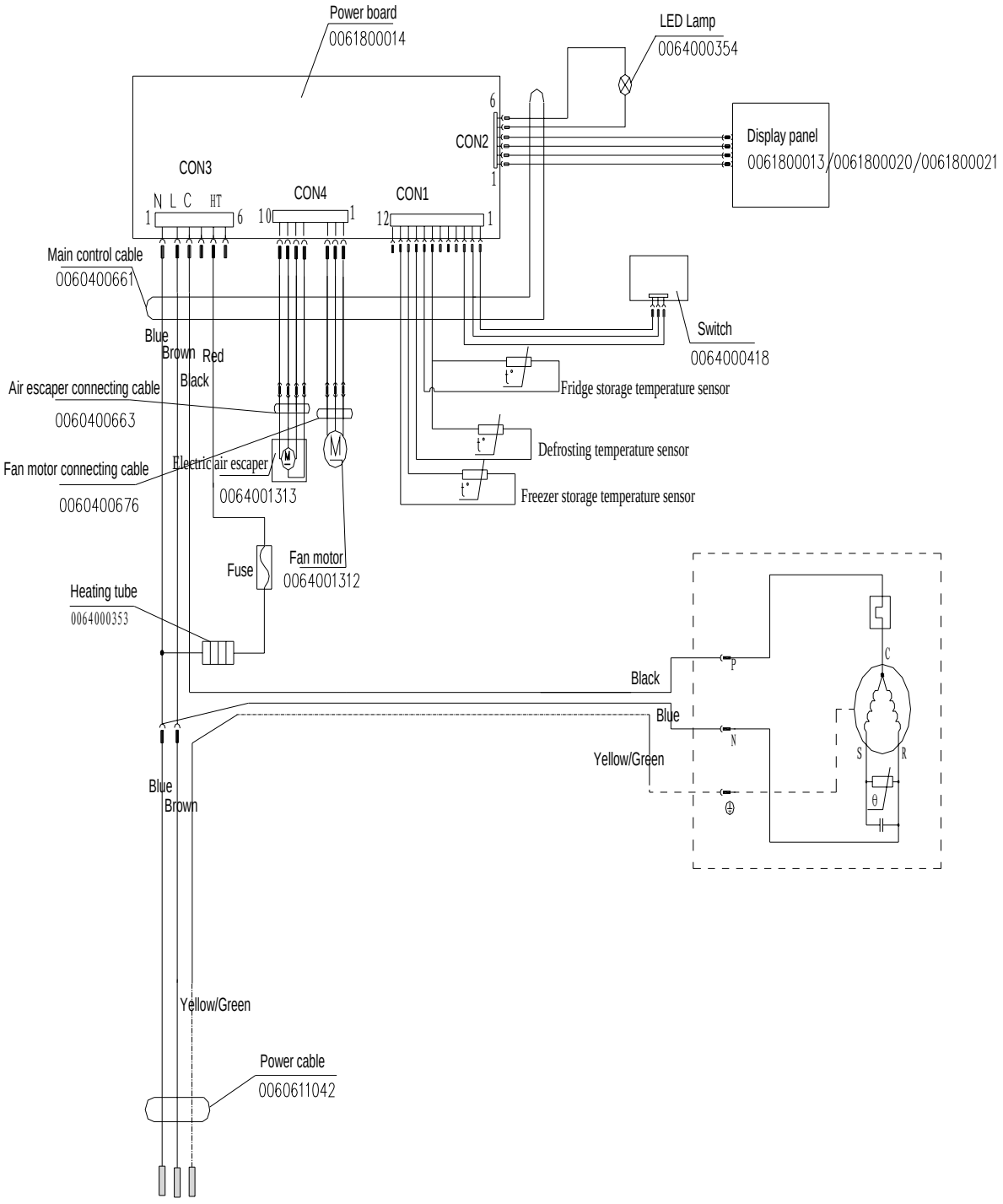
6.3 Air Flow Chart

Schematic drawing and description of air circulation in the refrigerator air-duct



Chapter 7 Circuit diagram

7-1. Main control PCB diagram



7-2. Main control PCB connections

There are 4 connectors on the main control panel of CFE/AFL/AFD refrigerators.

CN1 is the connector for the sensors and the door switch. Its pins from the left to right are:

1: GND

2: +12V

3: Door switch signal. When the door is opened, GND and the signal wires are switch to conduction. When the door is open, the wires are disconnected;

4-6: Null

7-8: Connected to the fridge storage temperature sensor. We can test the sensor with these two wires. Its resistance in normal operation is between 6.35 and 3.88kΩ (correspond to 0℃～10℃). The resistance at normal temperature is between 2.45 and 1.58kΩ (correspond to 20℃～30℃);

7-9: Connected to defrosting temperature sensor. We can test the sensor with these two wires. Its resistance in normal operation is between 10.9 and 25.19kΩ (correspond to -10℃～-25℃). The resistance at normal temperature is between 2.49 and 1.61kΩ (correspond to 20℃～30℃);

10-11: Connected to the freezer storage temperature sensor. Resistance test is the same as the defrosting temperature sensor;

12: Null

CN2 is the connector for the LED lamps and display panel:

1: GND

2: +5V

3: Com

4: Com

5-6: Null

7: +12V

8: GND

CN3 is the connector for the power cables

1: Zero line

2: Live line

3: Compressor (between it and the zero line)

4: Null

5: Heating tube for defrosting. The resistance between it and the zero is 345Ω±10%

6: Null

CN4 is the connector for the air door and fan:

1: Feedback signal from the fan

2: GND of the fan

3: +12V of the fan

4: fan +12V

5-6: Null

7-9: Motor of the refrigeration air door

Chapter 8 Trouble shooting

8-1. Common problems and solutions

8-1-1 Symptom: food in the fridge storage compartment is frozen

Check:

1) Verify that the temperature in the fridge storage compartment is too low and the food is frozen there;
2) Remove the decoration piece of the refrigeration air-duct. Detach the 2 screws and take out the air door-foam assembly. Press the “Refrigeration OFF” button to see if the air door closes automatically. If the air door closes tightly, continue to next step. If the air door does not close normally, continue to step 6).
3) Disconnect the connection wires of the air door and the LED lamps. Take out the air door-foam assembly. Tear the adhesive tape wrapped around the foam and separate the foam. Check if the seal between the air door and the foam is tight.
4) If the seal is tight, check if the fridge storage temperature sensor R1 is OK.
5)If the sensor R1 is OK, then the main control panel is probably malfunctioning.
6) If the wiring of the air door is OK, check the circuit from the connector of the main control panel to the connector in the cabinet. If there is no problem in this circuit, the air door is malfunctioning.

Solutions:

1) If the seal between the air door and the foam is found to be not tight, please affix seal strip on the interface between the air door and the foam;
2) If the sensor R1 is malfunctioning, please replace it with a new one;
3) If the main control panel is malfunctioning, please replace it with a new one;
4) If the connector of the air door is connected with reverse polarity, please reconnect it correctly;
5) If the air door is malfunctioning, please replace it with a new one.

8-1-2 Symptom: the buzzer beeps to alarm

1) Test across pin 1 and pin 3 of CN1 on the main control panel. The 2 pins should be switched to conduction when the door is closed and disconnected when the door is open.
2) If pin 1 and pin 3 of CN1 are disconnected in both cases, please remove the front decoration strip to see if the door switch is still in the slot.

8-1-3 Symptom: no defrosting

Check:

1) Activate the forced defrosting function by double pressing the button on the main control panel. Then, check if the temperature of the defrosting heating wire is rising.

   If the temperature of the heating wire does not change, remove the fan cover plate to check if all the connectors are connected properly and test if there is 220V voltage output across the terminals of the heating wire.

2) Measure the resistance of the heating wire with a multimeter. It should be around 345Ω.
3) Measure the resistance of the defrosting fuse. If it is zero, the fuse is OK. If it is infinite, the fuse is malfunctioning.
4) If no malfunction is found in the above checks, please test the defrosting temperature sensor with a multimeter.

8-1-4 Symptom: neither displaying nor starting when powering on

Check:

1) Check if the power supply is connected properly.
2) Remove the main control panel and examine its back side carefully to see if there are solder skips or open soldering;
3) Check if the connector of the freezer door hinge is connected properly.
4) Verify the display panel to see if the refrigerator is in OFF state. If so, press and hold the button on the power board for 3s to turn it on.

Solutions:

1) If there is dry soldering or open soldering on the control panel, resolder it with an electrical iron.
2) If any connector is not connected properly, replug it firmly.
3) Press and hold the button on the power board for 3s to turn the refrigerator on.

8-1-5 Symptom: poor freezing effect accompanied by loud noise

Check:

1) Check if there is apparent abnormal sound in the freezer storage compartment. Remove the fan cover plate, close the refrigeration air door (and the icemaker air door), and check if the freezer fan is operating normally. (The fan does not operate when the refrigeration air door is open. Please first eliminate the possibility of improper installation of the door on-off)
2) If the freezer fan does not run, remove it and check if its connector and the cabinet connector are connected properly. Test if there is approximately 12VDC voltage across pin2 and pin 3 of CN4. If there is no 12VDC voltage, the main control panel can generally be determined to be malfunctioning. If there is 12VDC voltage, the freezer fan can generally be determined to be malfunctioning.
3) If the fan rotates abnormally, the fan is malfunctioning.

Solutions:

（1）If there is apparent abnormal sound in the freezer storage compartment, check if the fan base is firmly fixed, if the fan vanes are installed properly, and if they intervene with the wires. If any of these problems is found, please remove the fan and reinstall it properly.

（2）If the fan connector is not installed properly, disconnect the terminals and reinstall the connector。

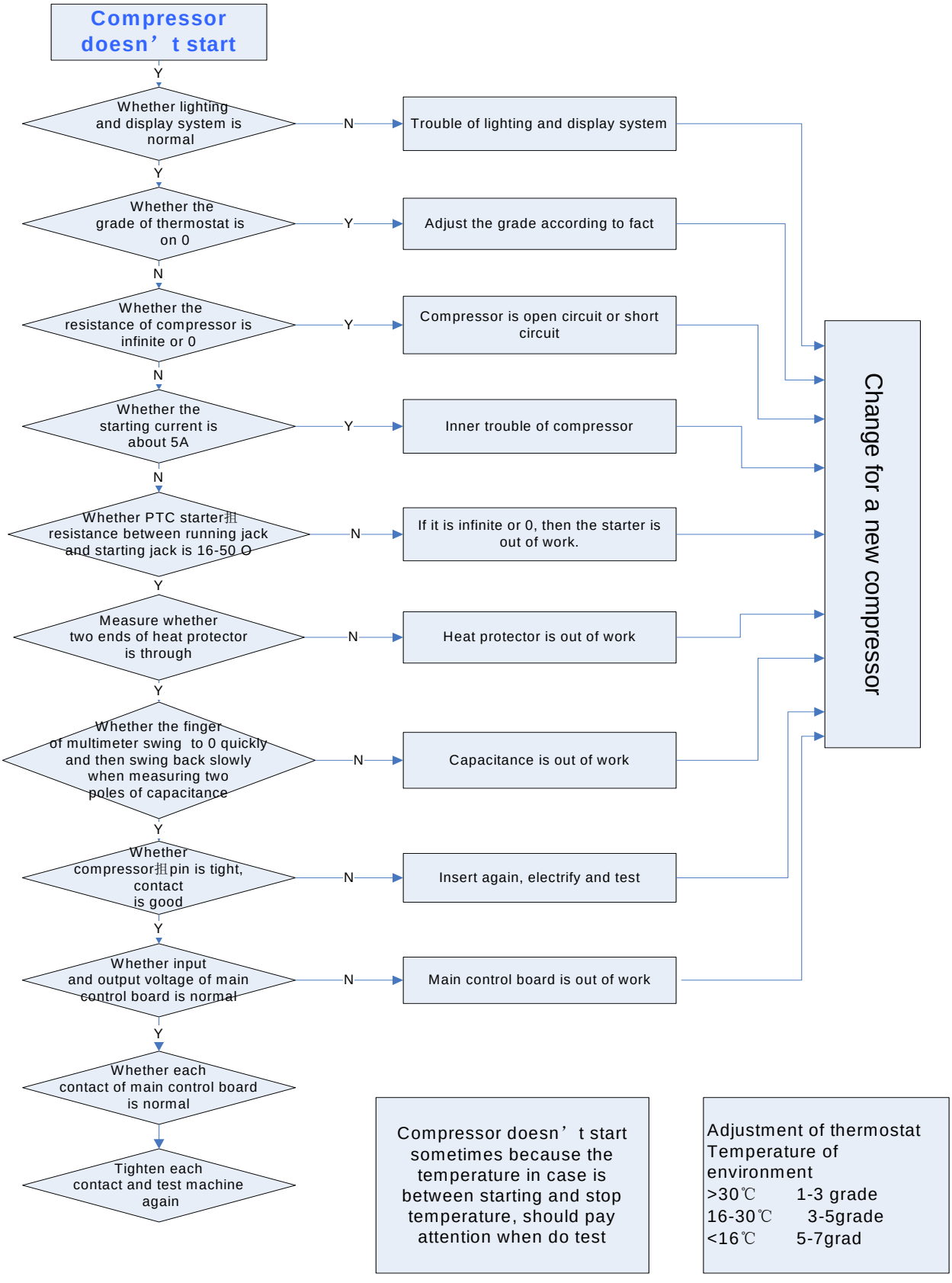
（3）If the main control panel or the fan is malfunctioning, replace the malfunctioning one with a good spare part.

8-2 Examination and Solutions for Other Problems

Problems	Causes	Solutions
Water/moisture/frost in the refrigerator		
Moisture accumulates on the refrigerators inner walls	● Hot and moist climate. ● The door is not closed tightly ● The door is opened too frequently or for too long time	● Accumulation of frost and moisture accelerate in such climate. ● Make sure the refrigerator is level and there is no food or container interfering with the door ● Do not open the door so frequently
Water/moisture/frost on outside surface of the refrigerator		
Moisture accumulates on the refrigerator's outside surface or between two doors	● Damp climate ● The refrigerator door is not closed tightly. This causes mixing of the cold air in the refrigerator with the warm air outside it	● It is normal in damp climate. The moisture will decrease when the humidity drops. ● Make sure the refrigerator is level and there is no food or container interfering with the door
Refrigerator operation		
The compressor does not work	● The refrigerator is in defrosting cycle. ● The refrigerator is not plugged into a power outlet. ● The refrigerator is in OFF state.	● It is normal for an automatic defrosting refrigerator. ● Verify the plug is plugged in the socket firmly. ● Press the "Power" button for 3 second or more to restart the refrigerator or turn the knob from OFF to temperature selection position.
The fridge storage compartment does not work	● The air door cable is not connected properly. ● The fan does not work ● The fridge storage compartment is turned off	● Check if the air door cable is not connected properly and install it correctly if not so. Verify that the air door acts normally with the Fridge ON/OFF key on the display panel ● The fan does not work while the refrigeration air door is open. Please check if the door on-off behind the front decoration strip is installed properly. Reinstall it correctly if not so. ● Turn on the fridge storage compartment manually
The refrigerator runs frequently or runs for too long period	● The indoor or outdoor temperature is high ● The refrigerator has been powered off for a period of time. ● The automatic icemaker is operating. ● The door is opened too frequently or for long periods. ● The door of the fridge / freezer storage compartment is not tightly closed. ● The temperature setting for the freezer storage compartment is too low ● The door gasket of the	● In this case, it is normal for the refrigerator to run longer. ● Normally, it takes 8 to 12 hours for the refrigerator to totally cool down. ● Icemaking process makes the refrigerator to run longer. ● Warm air enters the refrigerator and causes it to start frequently. Please do not open the door so frequently. ● Make sure the refrigerator is level place and there is no food or container interfering with the door. ● Set the temperature higher until satisfactory refrigerator temperature is obtained. It takes 24 hours for the refrigerator temperature to become stable. ● Clean or replace the door gasket. Leakage gap of door gasket can cause longer

	fridge/freezer storage compartment is dirty, worn, cracked or mismatched. ● The condenser is dirty.	running time of the refrigerator in order to maintain desired temperature. ● Clean the condenser.
Too high temperature		
Too high temperature in the fridge/freezer storage compartment	● The door is opened too frequently or for too long periods of time ● Temperature is set too high ● The door is not closed tightly ● The condenser is dirty	● Warm air will enter the refrigerator whenever the door is opened. Try to open the door as infrequently as possible. ● Reset the temperature. ● Make sure the refrigerator is on a level surface and there is no food or container interfering with the door. ● Clean the condenser.
The temperature in the freezer storage compartment is too high while the temperature in the fridge storage compartment is OK	● The temperature is set too high	● Set the freezer temperature lower. It takes 24 hours for the temperature of the refrigerator to become stable.
The temperature in the fridge storage compartment is too high while the temperature in the freezer storage compartment is OK	● The temperature is set too high	● Set the fridge temperature lower. It takes 24 hours for the temperature of the refrigerator to become stable.
Bad odors in the refrigerator		
The inside of the refrigerator is dirty	● The inside of the refrigerator needs cleaning ● Food with strong odor is stored in the refrigerator	● Clean the internal of the refrigerator ● Wrap the food tightly.
If you hear...		
Beeps	● The fridge storage compartment door is open ● The temperature in the freezer storage compartment is too high	● Close the door or silence the alarm manually ● The alarm is normal when it is first started due to relatively higher temperature.
Abnormal sound	● The refrigerator is not located on a level surface ● The refrigerator touches some object around it	● Adjust the feet to level the refrigerator. ● Remove objects around it.
Slight sound similar to that of flowing water	● It is the sound of the refrigerating system	● Normal.
Heating of cabinet	● The de-dew tube is de-dewing	● It is a process to prevent dewing. It is a normal phenomenon.

8-3. Checking flow chart


Compressor doesn’ t start
Whether lighting and display system is normal
N
Trouble of lighting and display system
Y
Whether the grade of thermostat is on 0
Y
Adjust the grade according to fact
N
Whether the resistance of compressor is infinite or 0
Y
Compressor is open circuit or short circuit
N
Whether the starting current is about 5A
Y
Inner trouble of compressor
N
Whether PTC starter担 resistance between running jack and starting jack is 16-50 O
N
If it is infinite or 0, then the starter is out of work.
Y
Measure whether two ends of heat protector is through
N
Heat protector is out of work
Y
Whether the finger of multimeter swing to 0 quickly and then swing back slowly when measuring two poles of capacitance
N
Capacitance is out of work
Y
Whether compressor担pin is tight, contact is good
N
Insert again, electrify and test
Y
Whether input and output voltage of main control board is normal
N
Main control board is out of work
Y
Whether each contact of main control board is normal
Tighten each contact and test machine again
Change for a new compressor

Compressor doesn’ t start sometimes because the temperature in case is between starting and stop temperature, should pay attention when do test

Adjustment of thermostat
Temperature of environment
>30℃ 1-3 grade
16-30℃ 3-5grade
<16℃ 5-7grad

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Sincere forever

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